

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of the Petitions of)
)
FRIENDS OF THE SEA OTTER AND)
DEPARTMENT OF FISH AND GAME)
)
For Review of Orders Nos. 88-09 and)
88-183 of the California Regional)
Water Quality Control Board, Central)
Coast Region, NPDES Permit No.)
CA0049280. Our Files Nos. A-595 and)
A-595(b).)
)

ORDER NO. WQ 90-1

BY THE BOARD:

On November 18, 1988, the California Regional Water Quality Control Board, Central Coast Region (Regional Board), adopted Orders Nos. 88-09 and 88-183. Order No. 88-09 contains waste discharge requirements for the ocean discharge of treated effluent from the City of Watsonville's publicly owned treatment plant. In issuing Order No. 88-09, the Regional Board concurred in a waiver of secondary treatment requirements by the federal Environmental Protection Agency (EPA), as authorized under Section 301(h) of the federal Clean Water Act, 33 U.S.C. Section 1251 et seq. Order No. 88-183 directs the City to cease and desist from discharging wastewater in violation of Order No. 88-09. Petitioners, Friends of the Sea Otter and the Department of Fish and Game (Department), filed timely petitions

for review of Orders Nos. 88-09 and 88-183.¹ Petitioners challenge the Regional Board's actions principally on the ground that the criteria for a waiver of secondary treatment requirements have not been satisfied.

I. BACKGROUND

Under the federal Clean Water Act, no person may discharge wastewater to the ocean or other waters of the United States except as authorized by a National Pollutant Discharge Elimination System (NPDES) permit. See 33 U.S.C.A. Sections 1311, 1342. In California, these permits are issued by the State Water Resources Control Board (State Board) and the nine California Regional Water Quality Control Boards, in accordance with regulations adopted by EPA. See *id.* Section 1342(b); California Water Code Section 13370 et seq.

NPDES permits regulate the discharge of pollutants from point sources to surface waters through the application of technology-based treatment requirements. The permits must, in addition, include any more stringent limitations necessary to assure compliance with receiving water standards and other applicable state and federal requirements. 33 U.S.C. Section 1311(b)(1)(C).

¹ The Ventana Chapter of the Sierra Club also filed a petition in this matter. The petition was dismissed after the Sierra Club failed to submit an amended petition, complying with this Board's petition regulations. See 23 C.C.R. Section 2050 et seq.

NPDES permits issued to publicly owned treatment works (POTWs) must include technology-based effluent limitations based upon secondary treatment. See 33 U.S.C. Sections 1311(b)(1)(B) and 1342. The Administrator of EPA has defined secondary treatment in terms of three parameters: biochemical oxygen demand (BOD), suspended solids (SS), and pH. See 40 C.F.R. Section 133.102. In particular, EPA regulations specify that, on a 30-day average, the concentration of SS in treated effluent shall not exceed 30 milligrams per liter (mg/l), and the percent removal of SS in the influent must be at least 85 percent. Id.(b).² In California NPDES permits issued for discharges from POTWs to ocean waters must also comply with the water quality standards for ocean waters established in the State Board's 1988 Water Quality Control Plan, Ocean Waters of California (Ocean Plan). These standards have been approved by EPA. The standards include a standard which generally requires 75 percent removal of SS, a level of treatment referred to as "advanced primary". Ocean Plan at 6.

In 1977 Congress amended the Clean Water Act to include Section 301(h). 33 U.S.C. Section 1311(h). This section authorizes EPA to waive the requirement of secondary treatment

² Section 133.102 imposes identical requirements for BOD concentrations. In addition, the regulation specifies that effluent values for pH must, in general, be maintained within the limits of 6.0 to 9.0.

for POTWs discharging into marine waters, if the applicant demonstrates that the following criteria are met:

"(1) there is an applicable water quality standard specific to the pollutant for which the modification is requested, which has been identified under section 1314(a)(6) of this title;

(2) the discharge of pollutants in accordance with such modified requirements will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife, and allows recreational activities, in and on the water;

(3) the applicant has established a system for monitoring the impact of such discharge on a representative sample of aquatic biota, to the extent practicable, and the scope of such monitoring is limited to include only those scientific investigations which are necessary to study the effects of the proposed discharge;

(4) such modified requirements will not result in any additional requirements on any other point or nonpoint source;

(5) all applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced;

(6) in the case of any treatment works serving a population of 50,000 or more, with respect to any toxic pollutant introduced into such works by an industrial discharger for which pollutant there is no applicable pretreatment requirement in effect, sources introducing waste into such works are in compliance with all applicable pretreatment requirements, the applicant will enforce such requirements, and the applicant has in effect a pretreatment program which, in combination with the treatment of discharges from such works, removes the same amount of such pollutant as would be removed if such works were to apply secondary treatment to discharges and if such works had no pretreatment program with respect to such pollutant;

(7) to the extent practicable, the applicant has established a schedule of activities designed to eliminate the entrance of toxic pollutants from nonindustrial sources into such treatment works;

(8) there will be no new or substantially increased discharges from the point source of the pollutant to which the modification applies above that volume of discharge specified in the permit;

(9) the applicant at the time such modification becomes effective will be discharging effluent which has received at least primary or equivalent treatment and which meets the criteria established under section 1314(a)(1) of this title after initial mixing in the waters surrounding or adjacent to the point at which such effluent is discharged."³

Under Section 301(h) authority to issue an NPDES permit, incorporating a waiver of secondary treatment requirements, resides in the Administrator of EPA. Id. The State must, however, concur in the issuance of a modified permit under Section 301(h). Id. In California waste discharge requirements authorizing a discharge at less than secondary treatment constitute the State's concurrence in the issuance of a 301(h) waiver.

The City of Watsonville operates a wastewater treatment facility serving the City, Freedom County Sanitation District, Pajaro County Sanitation District, and Salsipuedes Sanitary District. On September 13, 1979, the City applied for a 301(h) waiver for the discharge from its facility. At that time the City's treatment plant provided primary treatment for an average annual flow of 8.15 million gallons per day (mgd). The

³ Section 301(h) was amended on February 4, 1987, by Public Law 100-4. Two new provisions were added, Subsections (6) and (9). EPA's Tentative Decision granting Watsonville a Section 301(h) waiver indicates that the City's application was reviewed for compliance with Section 301(h), as amended by Public Law 100-4. See Tentative Decision of the Regional Administrator, dated July 29, 1987, Pages 1-5.

effluent was discharged to Monterey Bay through a diffuser in 40 feet of water at the end of a 3,850 foot long ocean outfall. EPA tentatively denied the City's application on June 5, 1985. The City then submitted a revised application on May 30, 1986. The revised application was based upon an improved discharge, involving design and configuration changes to the treatment plant, a new parallel land outfall, and extension of the existing ocean outfall. The application sought a permit to discharge an annual average effluent flow of 11 mgd. An EPA consultant, Tetra Tech, Inc., evaluated the revised application and prepared a Technical Review Report, dated December, 1986 (TRR). Based upon the recommendations in the report, the Regional Administrator of EPA issued a tentative decision approving the application on July 29, 1987 (Tentative Decision).

EPA and Regional Board staff subsequently prepared a draft order, constituting both an NPDES permit and waste discharge requirements for the Watsonville discharge. On June 10, 1988, EPA and the Regional Board conducted a joint hearing to receive testimony on EPA's tentative decision to grant the City a Section 301(h) waiver and on the proposed order. The public comment period was kept open after the hearing until June 25, 1988. The Regional Board received additional public testimony on the proposed order on November 18, 1988. At the

conclusion of the hearing the Regional Board adopted Order No. 88-09 and Cease and Desist Order No. 88-183.⁴ To date, EPA has not signed Order No. 88-09; consequently, the order is not currently in effect. See Order No. 88-09, Prov. D.1.

II. CONTENTIONS AND FINDINGS

1. Contention: Petitioners contend that the Regional Board failed to adequately protect the quality of waters in Monterey Bay for the beneficial uses of sea otter habitat and shellfish harvesting. Petitioner, Friends of the Sea Otter, alleges that the Regional Board failed to adequately consider the threat to the sea otter and its habitat posed by the bioaccumulation of toxic substances in sea otter prey species, the discharge of pathogenic bacteria, and the cumulative impacts of discharging toxic substances into the bay. Petitioner, the Department, raises similar issues and, in addition, contends that Order No. 88-09 fails to properly regulate the discharge of chlorine to the bay.

Finding: Both the Ocean Plan and Section 301(h) of the Clean Water Act require protection of marine communities. The Ocean Plan specifies that the beneficial uses of ocean waters

⁴ Cease and Desist Order No. 88-183 was issued for violation of the BOD, SS, and chlorine residual effluent limitations in Order No. 88-09. The Regional Board anticipated that the cease and desist order would be in effect for only a few months. Under Order No. 88-183, the City was required to achieve full compliance with Order No. 88-09 at February 1, 1989.

that shall be protected include marine habitat, shellfish harvesting, and rare and endangered species. Ocean Plan at 1. The Ocean Plan establishes a water quality objective requiring that:

"Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded." Id. at 4.

Degradation is determined by analyzing the effects of the discharge on such factors as "species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species". Id. Appendix.

Section 301(h) contains similar requirements for the protection of marine life. Section 301(h) requires that an applicant demonstrate that the discharge will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of that water quality which assures the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife. 33 U.S.C. Section 1311(h)(2). EPA has defined a balanced, indigenous population as an ecological community which:

"(1) Exhibits characteristics similar to those of nearby, healthy communities existing under comparable but unpolluted environmental conditions; or

(2) May reasonably be expected to become re-established in the polluted water body segment from adjacent waters if sources of pollution were removed." 40 C.F.R. Section 125.58(f).

In order for a 301(h) waiver to be granted, a balanced, indigenous ecological community must exist immediately beyond the zone of initial dilution and in all other areas beyond the zone of initial dilution where marine life is actually or potentially affected by the discharge. Id. Sec. 125.61(c).⁵

In order to assess the impact of the modified Watsonville discharge on sea otter habitat and shellfish harvesting, it is appropriate to first examine the extent and intensity of these uses. The southern sea otter (Enhydra lutris nereis) is listed as a "threatened" species under the federal Endangered Species Act, 16 U.S.C. Section 1531 et seq. A 1986 census by the United States Fish and Wildlife Service (USFWS) counted approximately 1,300 to 1,400 post-juvenile otters along the California coast. TRR at 147. Although the southern sea otter population has been growing since it began to recover from near extinction earlier in this century, the population may now be slightly declining. Id. The growth rate of the California population has been estimated by the USFWS at about 7.5 percent, as compared to increases of 17 percent to 20 percent in other sea otter populations in Washington state, Alaska, and British

⁵ The "zone of initial dilution" is defined in EPA regulations as the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports. 40 C.F.R. Section 125.58(w).

Columbia. Friends of the Sea Otter, Memorandum of Points and Authorities (FSO Memorandum) at 5.

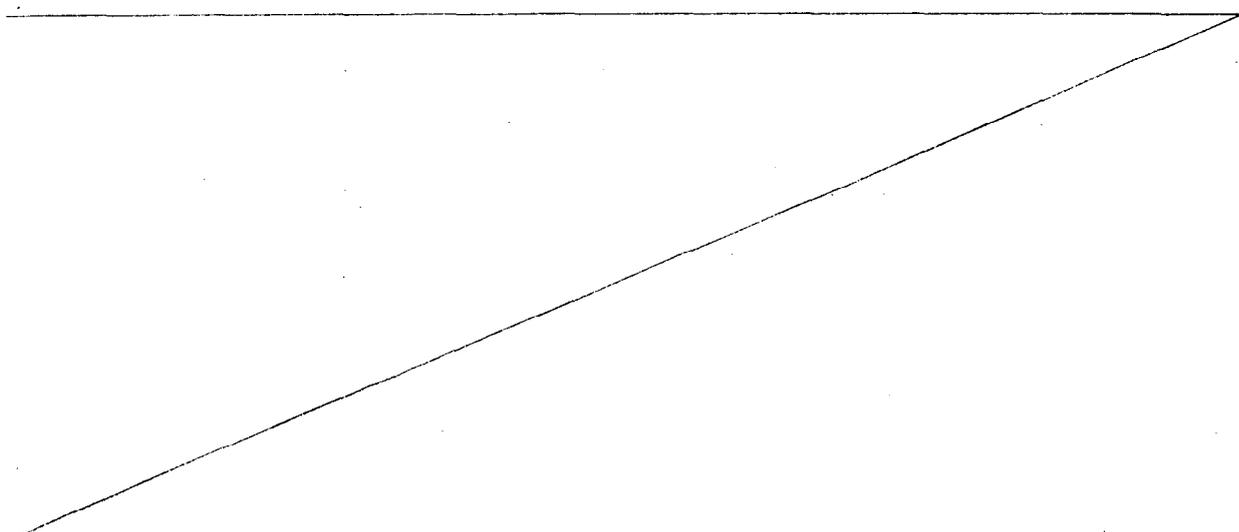
Monterey Bay provides important habitat for the sea otter. A recent census by the USFWS counted over 150 otters in the bay. Petition of Friends of the Sea Otter (FSO Petition) at 4. Kelp beds on rocky bottoms are the preferred habitat of the sea otter for resting and feeding. TRR at 148. The Watsonville outfall, in contrast, is surrounded by a sandy-bottom benthos, a type of habitat which may be used by the otter for foraging. Otters have been sighted in the area although their presence is termed "occasional". Id. According to the USFWS, two sea otters reside off the Watsonville outfall. Section 7 Endangered Species Consultation letter, dated September 20, 1985 (Sec. 7 Letter), at 5. And, the outfall is presumed to be on the migratory path of otters travelling between Santa Cruz and Monterey. Evidence in the record supports the conclusion, therefore, that the use of bay waters for sea otter habitat is both an historical and an existing use.

The extent of shellfish harvesting is described in Finding 17 of Order No. 88-09. Existing clamming uses in the vicinity of the discharge include the collection of undersized clams in the surf zone by poachers and the collection of surf clams washed up on the Watsonville area beaches during heavy winter storms. Finding 17 also recognizes two potential uses. The Department has considered establishing a legal fishery for small size Pismo clams. The Department also recognizes a

potential commercial offshore surf clam fishery. The latter use has not been realized to date, however, nor is it anticipated in the near future.

a. Toxic Substances

Petitioner, Friends of the Sea Otter, contends that the discharge of advanced primary effluent will degrade sea otter habitat due to the increased threat of bioaccumulation of toxic substances in sea otter prey species. EPA, on the other hand, concluded that since the discharge of toxic substances from the Watsonville plant was expected to be low, the potential for bioaccumulation of these substances would also be low. Tentative Decision at 76. In general, substantial impacts on sea otters were considered unlikely because sea otter abundance in the Watsonville area is low. Id. Nevertheless, EPA and the Regional Board included in Order No. 88-09 a requirement that Watsonville submit a proposal to assess the bioaccumulation and bioconcentration of all priority pollutants, excluding asbestos, and certain pesticides in caged mussels deployed, at a minimum, at the zone of initial dilution monitoring stations and at a



reference station.⁶ Monitoring and Reporting Program No. 88-09, Sec. VI, B.

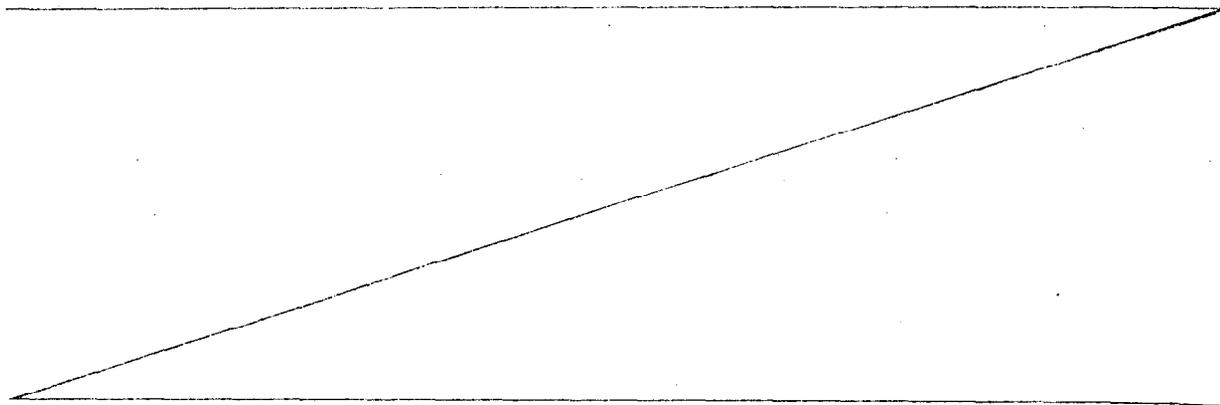
The potential impacts of toxic substances on marine biota is a factor which must be considered in analyzing whether a modified 301(h) discharge will assure a balanced, indigenous population of shellfish, fish and wildlife. The discharge of toxic substances to California's marine waters is also addressed in the Ocean Plan. The discharge of toxic substances to ocean waters is regulated primarily through the inclusion of effluent limitations in waste discharge requirements, which implement the water quality objectives for toxics contained in the Ocean Plan. See Ocean Plan, Table B, at 7. These objectives were developed, however, primarily for the protection of aquatic life; and they, for the most part, do not address the issues of accumulation of toxic substances in marine organisms and sediments and the resulting impacts to ecological communities and human consumers of seafood. Rather, bioaccumulation of toxic substances is regulated through narrative objectives in the Ocean Plan. See Ocean Plan, Ch.II.D.1, Ch.III.B.3. For purposes of compliance with both the requirements of Section 301(h) and the Ocean Plan,

⁶ "Priority pollutants" refer to the 126 pollutants listed in Appendix A to 40 C.F.R. Part 423. The 126 priority pollutants are derived from the 65 classes of compounds listed at 40 C.F.R. Section 401.15. The "pesticides" are those referred to in the EPA regulations on Section 301(h). They include: demeton, guthion, malathion, mirex, methoxychlor and parathion. Id. Section 125.58(m).

therefore, one must analyze the data on concentrations of toxic substances in marine biota in the region of a proposed 301(h) discharge.

The City of Watsonville submitted data from four bioaccumulation studies done in the area of the existing and extended outfalls, as well as State Mussel Watch data, to address the issue of bioaccumulation. See TRR, Pages 179-196. The four studies are the 1980 Mussel Bioaccumulation Study, the 1980 Fish and Shellfish Bioaccumulation Study, the 1984 Fish and Shrimp Bioaccumulation Study and the 1986 Watsonville Baseline Monitoring Study. The results of the 1980 and 1984 Fish and Shellfish Bioaccumulation Studies were inconclusive.

The 1980 Mussel Bioaccumulation Study examined bioaccumulation of metals in caged mussels at three stations relative to the existing outfall: within the zone of initial dilution; outside the zone of initial dilution; and at a reference station five kilometers from the outfall. Mussels were collected after 9 weeks and again after 32 weeks. Although significant differences were found in tissue concentrations among the stations, the relationship between tissue concentration and proximity to the outfall was not consistent.



For example, concentrations of mercury, the only toxic substance to exceed EPA water quality criteria for protection of aquatic life at the edge of the new zone of initial dilution, were not significantly different among all stations.⁷

Concentrations of cadmium at the outfall stations increased substantially between sample dates. The applicant attributed the relatively high cadmium concentrations to upwelling in Monterey Bay. This phenomenon was also cited in the 1985-1986 State Mussel Watch Report as the source of higher cadmium levels in central and northern California waters, as compared to southern California. The data in the record, however, are insufficient to determine whether the cadmium levels can be attributed to upwelling.

Mean concentrations of all other metals analyzed were below the 95 percent Elevated Data Level (EDL 95), at all points on both sampling dates. The EDL 95 is the concentration below which 95 percent of the State Mussel Watch measurements taken from 1977 to 1987 for a substance fall. Data provided by the applicant indicated that the mean concentrations of silver, copper, mercury, lead and zinc in mussels collected at the

⁷ EPA water quality criteria are established pursuant to Section 304(a) of the Clean Water Act. 33 U.S.C. Section 1314(a). They are numerical values used to evaluate whether or not priority pollutants are present in receiving waters in concentrations that adversely affect aquatic life. Like the Ocean Plan Table B toxic objectives, the EPA criteria do not, in general, address the issue of accumulation of toxic substances in marine organisms and sediments.

Watsonville sites were comparable to levels recorded at the State Mussel Watch reference areas during 1977 and 1978.

Concentrations of cadmium, manganese, and chromium at Watsonville were higher than the State Mussel Watch reference sites.

However, manganese and chromium concentrations were higher in mussels collected at the Bodega Head reference station, the source of the mussels transplanted to Watsonville, than in the mussels exposed at Watsonville.

Tissue concentrations of metals in mussels may change as a result of factors unrelated to the discharge of waste, such as the season, reproductive cycle, and oceanographic conditions. Insufficient data were collected in the 1980 Mussel Bioaccumulation Study to determine the impact of these factors, if any, on tissue concentrations. Most mussel tissue concentrations were below the EDL 85's, the concentration below which 85 percent of the State Mussel Watch measurements taken from 1977 to 1987 for a substance fall. Based upon this fact and upon the comparisons with reference sites, the data do not indicate the presence of a bioaccumulation problem.

In the 1986 Baseline Monitoring Study speckled sanddab were collected from the existing zone of initial dilution, the proposed zone of initial dilution, and beyond the proposed zone of initial dilution, and muscle tissues were analyzed for all the priority pollutants, except asbestos, and for six volatile nonpriority pollutants. In samples from the existing zone of

initial dilution, only p,p'-DDE, a DDT derivative, was detected. DDT was not detected in the effluent or the sediments within the existing zone of initial dilution. The source of the DDT could not be determined from the data. Concentrations of metals in sanddab muscle tissue from the three sampling stations were compared and were not found to be significantly different, except for chromium and zinc which were higher at the outfall station.

The results of a special pesticide study conducted by the State Mussel Watch in the vicinity of Moss Landing were also submitted by the applicant. Notably high levels of toxaphene, endosulfan I, and DDT and its derivatives were found at a station at the mouth of Watsonville Slough. The results indicate that nonpoint sources contribute to the bioaccumulation of pesticides in marine biota in the Watsonville area. These substances were not detected in Watsonville's effluent, indicating that the treatment plant is a much less important, if not insignificant, source of pesticides when compared to agricultural activities.

The applicant did not submit any data addressing bioaccumulation in sea otters. In fact, according to the USFWS, no studies have been specifically conducted to measure and evaluate impacts from wastewater discharge to either sea otters or their prey species. Sec. 7 Letter at 5.

In sum, we conclude that the bioaccumulation data submitted by the applicant do not indicate that toxics in the existing Watsonville discharge have impaired wildlife habitat or shellfish. Consequently, the Regional Board could reasonably

conclude that bioaccumulation of toxics in sea otter prey species should not be a significant concern with respect to Watsonville's 301(h) discharge. To confirm this conclusion, we concur with the Regional Board's inclusion in Order No. 88-09 of monitoring requirements addressing the issue of bioaccumulation of toxic substances in both sea otters and their prey species. See Monitoring and Reporting Program No. 88-09, Section VI.

b. Pathogens

Petitioners contend that the discharge of pathogenic bacteria may preclude human consumption of shellfish and threaten the sea otter population. Petitioners allege that pathogenic bacteria may threaten sea otters either through direct ingestion, especially of pathogens absorbed onto particles, or through ingestion of contaminated prey, particularly shellfish.

Petitioner, the Department, additionally contends that the chlorination method selected by the City is inappropriate. The Regional Board responds that there is nothing in the record to indicate that the bacterial limits included in Order No. 88-09 are inappropriate or that the City cannot meet the limits.

The issue raised by petitioners deserves careful consideration in the Section 301(h) waiver process because bacteria are strongly associated with particulate matter, and secondary treatment results in greater removal of suspended solids than advanced primary. Of course, concentrations of pathogenic bacteria can also be decreased by chlorination.

(1) Compliance with Ocean Plan Bacteriological Limits

The Ocean Plan contains water quality objectives for bacteria, measured by the conventional indicators, total and fecal coliform, for both body contact and shellfish harvesting. Ocean Plan, Ch.II.A. The objectives are ambient standards, rather than effluent limitations, and compliance with the standards is determined from samples collected in the receiving waters.

Order No. 88-09 incorporates the applicable Ocean Plan standards for body contact and shellfish harvesting. Order No. 88-09, C. Receiving Water Limitations, 1.a. and b. The shellfish bacterial limits included in Order No. 88-09 are applied only at shoreline locations at the present time. Id. Finding 17. According to Order No. 88-09, the bacterial limits for shellfish harvesting would be necessary to approximately the 60-foot depth contour if commercial surf clam harvesting proves feasible in the future. Order No. 88-09, Finding 17.

Order No. 88-09 also includes effluent limitations for total and fecal coliform. Order No. 88-09, Effluent Limitations B.5 and 6. Order No. 88-09 requires disinfection of the effluent to achieve a total coliform concentration of 10^6 per 100 milliliters (ml). These limitations were included in the order to ensure that the Ocean Plan receiving water objectives for bacteria were not exceeded.

Both the City of Watsonville and the EPA consultant, Tetra Tech, developed models to analyze the question of whether

the City's 301(h) discharge would comply with the bacteriological limits contained in the Ocean Plan. The City of Watsonville originally designed its extended outfall with the intent of meeting the receiving water objectives by means of die-off and dilution, without chlorination. The City included the results of a model by Montgomery Engineers in its revised 301(h) waiver application predicting the frequency of violations of Ocean Plan bacteriological standards. See TRR, Pages 207-224. According to this model, shellfish harvesting standards would not be violated at the 10-foot contour if the effluent coliform concentration was lower than 5×10^6 per 100 milliliters (ml).

Tetra Tech also developed a model to predict nearshore coliform levels. The Tetra Tech model considered only compliance with body contact standards. On the basis of the model results, Tetra Tech concluded that, with an effluent concentration of $5 \times 10^6/100$ ml, body contact standards would be met at the 30 foot contour for all cases except worst case conditions; i.e., cloudy days with a 100 percent probability of the discharge plume surfacing. Under the latter conditions, EPA estimated that there would be a one percent probability of violation of the body contact standard during the months of October and November only. Tentative Decision at 44. Tetra Tech concluded that, in worst case conditions, an effluent limitation of $3 \times 10^6/100$ ml would allow body contact standards to be met. It should be noted that the Ocean Plan shellfish harvesting standard is 14.3 times lower than the body contact standard.

Based upon this data, EPA and the Regional Board set the effluent limitation for coliform in the Watsonville permit at $1 \times 10^6/100$ ml. This concentration is five times lower than the concentration which the models predicted might cause a violation of the bacteriological standards in the Ocean Plan.

It is difficult to gauge the accuracy of either the City's or Tetra Tech's models because neither included a sensitivity analysis nor confidence intervals for the predicted values. The physical situation which was modelled is very complex and is not fully understood. As a result, we conclude that the models cannot be completely relied upon to determine whether bacterial standards will be met.

Compliance must also be demonstrated by ambient monitoring. The monitoring requirements in the draft permit will allow the Regional Board to confirm the modeling data. In particular, we note that the monitoring program for the Watsonville discharge includes a provision requiring the discharger to analyze any mollusks collected for total and fecal coliform and enterococci organisms. Monitoring and Reporting Program No. 88-09, Section VI.A.2. Should the monitoring data indicate that the Ocean Plan bacteriological limits are not being met, the Regional Board can revise the coliform limitations in Order No. 88-09. In sum, we conclude that the Regional Board acted reasonably, on the basis of the available evidence in the record, in selecting the effluent coliform limits included in

Order No. 88-09 and that the required bacteriological monitoring will allow the Regional Board to further monitor this issue.

(2) Sea Otter Habitat

According to the USFWS, there have been a few reports of infection of sea otters, possibly related to raw sewage. It is reasonable to assume that at least some human pathogens are pathogenic to otters as well and that waste-borne pathogens, therefore, pose a risk to sea otter populations. The degree of this risk is unknown. No bacterial standards have been established, to date, for the protection of marine mammals. Further, there is no information in the record from which an appropriate standard could be derived. In addition, the record in this case has focused on bacterial pathogens as gauged by bacterial indicator organisms (total and fecal coliform). In fact, many, if not most, of the pathogens in sewage are viruses, which do not exhibit the same die-off behavior as coliform.

Petitioner, Friends of the Sea Otter, cites research regarding the survival of viable, non-culturable bacteria to support its contention that the proposed Watsonville discharge is not adequately protective of sea otters. See FSO Petition, Exhibit C. A 1986 research paper by Dr. Grimes concluded that bacterial pathogens, previously thought to die rapidly in seawater, can survive for indeterminate periods of time in the marine environment in a fully viable and infectious, although non-culturable, form. Traditional bacterial counting techniques rely on the culture of cells. Therefore, the bacteria cited in

the Grimes research paper would not be measurable by current regulatory and monitoring techniques.

While the Grimes research appears to be credible, the pervasiveness of the phenomenon described by Grimes in the marine environment is unknown. Consequently, the risk to marine mammals posed by the existence of viable non-culturable bacteria is also unknown. To date, the Ocean Plan has not explicitly addressed the issues of risk to marine mammals from waste-borne pathogens or the presence of viable, non-culturable bacteria in wastewater.

The added monitoring requirement of testing mollusks for total and fecal coliform will provide more information on which to assess the risk to otters through the food chain. To further address this issue, we conclude that bacterial testing should be added to the required analysis of the caged bivalves, which is currently part of the City's bioaccumulation monitoring program. See Monitoring and Reporting Program No. 88-09, Section VI.B. A sample of the bivalves should be analyzed for total and fecal coliform and enterococci organisms.

(3) Chlorination Method

Petitioner, the Department, contends that the Regional Board improperly allowed the City to chlorinate its effluent within the discharge pipe. Petitioner alleges that the in-pipe method of chlorination cannot meet the public health standard for chlorine contact to protect shellfish harvesting and that the method cannot assure proper concentrations of chlorine residual.

Effective chlorination is a function of initial mixing, chlorine contact time, the chlorine control system, and reliability. When designed appropriately, in-pipe chlorination is an accepted method of disinfection. The appropriate contact time is a function of the necessary degree of disinfection and the dose. It is generally on the order of one hour, with a minimum contact time at peak flow of 30 minutes. The design flow detention time in the Watsonville outfall pipe is two hours. Therefore, the Department's concern that the public health standard for chlorine contact to protect shellfish harvesting (30 minutes at peak hourly flow) will not be met is unfounded.

With respect to chlorine residual, the record indicates that the City does have in-line monitors for residual chlorine immediately after the primary sedimentation basin and at the ocean surge chamber. These monitors should provide for adequate control of chlorine concentration.

c. Cumulative Impacts

Petitioner, Friends of the Sea Otter, contends that a 301(h) waiver is inappropriate because the Regional Board failed to evaluate the cumulative impacts of discharging advanced primary effluent to an area which already receives contaminants, particularly pesticides, from rivers and sloughs. The Regional Board responds that a 301(h) applicant is not required to perform a quantitative cumulative impacts analysis and that, in any event, the Regional Board did consider all pertinent data in the

record on the potential impacts of toxic substances in the Watsonville modified discharge on marine life.

Petitioner, Friends of the Sea Otter, appears to be principally concerned about the discharge of pesticides from such sources as Elkhorn Slough, the Pajaro River, and other nearby areas. Concentrations of pesticides, except for a DDT derivative, however, are currently undetectable in the Watsonville effluent.

Section 301(h)(2) requires that an applicant demonstrate that the discharge of pollutants under a modified permit "will not interfere, alone or in combination with pollutants from other sources" with the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife. 33 U.S.C. Section 1311(h)(2). Section 301(h) does not, however, require a quantitative cumulative impact analysis, relevant to all other pollutant discharges to marine waters. The applicant is required to provide a certification by the State that its proposed modified discharge is not expected to result in additional treatment or control requirements on other pollutant sources. 40 C.F.R. Section 125.63; see 33 U.S.C. Section 1311(h)(4). The Regional Board provided the necessary certification in this case in a letter, dated June 20, 1986.

All of the studies submitted by the applicant to examine the potential effects of the discharge on a balanced, indigenous population of shellfish, fish and wildlife were, in essence, examining cumulative impacts. There is no evidence in the record

to support the position that the Regional Board failed to consider this evidence. In addition, the monitoring program adopted by the Regional Board will address potential cumulative effects.

d. Chlorine Residual

Petitioner, the Department, contends that the Regional Board erred by failing to require that the City dechlorinate its effluent. Petitioner alleges that Order No. 88-09 fails to require that the City actively control the discharge of total chlorine residual; and, therefore, the order cannot ensure that toxic concentrations of chlorine are not present in the discharge.

The Regional Board implemented the receiving water objectives for chlorine residual in Table B of the Ocean Plan by including appropriate effluent limitations for total chlorine residual in Order No. 88-09. Order No. 88-09, Effluent Limitation B.3. No evidence was presented in the hearing record to suggest that the Ocean Plan objective for chlorine residual will not adequately protect marine life in the vicinity of the Watsonville discharge. In addition, there is no evidence in the record indicating that the City will have difficulty meeting this limit.

Regional Boards are precluded in most instances, under Water Code Section 13360, from specifying the manner in which dischargers choose to comply with the effluent limitations. Therefore, the Regional Board may not even have the

authority to specifically require the City to actively dechlorinate its effluent.

2. Contention: Petitioners allege that the sea otter monitoring program adopted by the Regional Board fails to meet the requirements of Section 301(h). Petitioner, Friends of the Sea Otter, contends that the program is inadequate because it was largely dependent on studies to be performed by the City of Santa Cruz, as part of its 301(h) waiver permit. Santa Cruz has since withdrawn its 301(h) waiver application, however. In addition, petitioners allege that the sea otter monitoring program was improperly reduced at the Regional Board's November 18 hearing without adequate opportunity for public comment.

Finding: Subsection (3) of Section 301(h) requires that an applicant have established a system for monitoring the impact of the modified discharge on a representative sample of aquatic biota, to the extent practicable. 33 U.S.C. Section 1311(h)(3). EPA regulations provide that the biological monitoring program for a 301(h) applicant "shall provide data adequate to evaluate the impact of the modified discharge on the marine biota".

40 C.F.R. Section 125.62(b). Biological monitoring must, to the extent practicable, include:

- "(i) Periodic surveys of the biological communities and populations which are most likely affected by the discharge to enable comparisons with baseline conditions described in the application and verified by sampling at the control stations/reference sites during the periodic surveys;
- (ii) Periodic determinations of the accumulation of toxic pollutants and pesticides in

organisms and examination of adverse effects, such as disease, growth abnormalities, physiological stress or death. . . ." Id.

The components of the monitoring program incorporated in Order No. 88-09, pertaining to sea otters, can be summarized as follows:

1. Annually, key prey species of otters or humans will be collected at two stations and analyzed for priority pollutants and pesticides. Mollusks will be analyzed for total and fecal coliform and enterococcus as well. If the collection is done by trawling, community structure analysis will be performed.

2. The discharger must determine critical concentrations of specific pollutants, which cause sea otter prey species to exhibit acute or chronic toxicity reactions, including lowered growth rates or reduced reproductive success. The monitoring program describes an eight-part program to define critical concentrations: (1) identify critical pollutants found in Watsonville's wastewater; (2) conduct a literature search on the effects of these pollutants on sea otter prey species; (3) prepare a report on the results of the literature search, including recommendations on additional studies; (4) if necessary, design a bioaccumulation study which addresses critical concentrations and specific effects of specific pollutants on key prey species; (5) submit a final study proposal to EPA and the Regional Board; (6) conduct the study; (7) submit progress reports; (8) prepare a report on the

findings of the study, including interpretation of annual tissue concentration data.

3. Bioaccumulation and bioconcentration of priority pollutants and pesticides will be assessed using caged bivalves at a minimum of three stations.

4. Tissues of two carcasses of beach cast otters will be analyzed per year for heavy metals, pesticides, and other priority pollutants. Monitoring and Reporting Program No. 88-09, Secs. IV.A.1-3, B, D.

The sea otter monitoring program included in Order No. 88-09 was developed by EPA in conjunction with the USFWS for the proposed waiver by the City of Santa Cruz. We hold that the withdrawal from the 301(h) waiver process by the City of Santa Cruz does not invalidate the sea otter monitoring program contained in Order No. 88-09. Our review of the Watsonville monitoring program indicates that most of the references to Santa Cruz's studies are simply aimed at avoiding duplication. Watsonville is, for example, advised to coordinate their literature review with Santa Cruz and is permitted to incorporate by reference literature surveys completed by Santa Cruz. However, Watsonville "must provide the additional information for pollutant and/or prey species unique to the Watsonville area". Id. Sec. VI.A.3. Similarly, the monitoring program provides that bioaccumulation studies, if required, "should be coordinated with those designed by the City of Santa Cruz, provided that similar pollutants and prey were identified in task a". Id.

The sea otter monitoring program provides for a periodic survey of sea otter prey species. It also provides a periodic determination of the accumulation of toxics and pesticides in prey species and otters and an examination of adverse effects in prey species. The direct sampling of sea otters is limited due to the threatened status of the sea otter under the Endangered Species Act. Given the legal constraints on direct monitoring of sea otters, we conclude that the sea otter monitoring program in Order No. 88-09 fulfills the requirements of Section 301(h) and the applicable federal regulations.

Petitioners allege that the sea otter monitoring program was improperly reduced at the November 18 hearing without adequate opportunity for public comment. Several days before the hearing the proposed program was revised to add language stating that the sea otter prey species bioaccumulation study could be reduced based upon the findings and conclusions of other sampling efforts required in the program. Id. Sec. VI.3. In addition, the sampling and collection of sea otter prey species was limited to species collected during trawling. Id.

The revisions did not substantially modify the proposed monitoring program. Under applicable state and federal regulations, the bioaccumulation study cannot, in fact, be reduced by the Regional Board without public notice and an opportunity for a hearing. See 23 C.C.R. Section 2235.2; 40 C.F.R. Section 122.62, 123.25. Therefore, petitioners will have an opportunity to comment on any proposed reductions in the

bioaccumulation study in the future. The limitation on the sampling of prey species to species collected during trawling appears to be a reasonable, minor change to the monitoring program.

3. Contention: Petitioners contend that Watsonville's discharge is not sufficiently "deep" to qualify for a waiver under Section 301(h).

Finding: Section 301(h) authorizes a waiver of secondary treatment requirements for "the discharge of any pollutant into marine waters". This phrase is defined in Section 301(h) as "a discharge into deep waters of the territorial sea or the waters of the contiguous zone, or into saline estuarine waters where there is strong tidal movement and other hydrological and geological characteristics which the Administrator determines [are] necessary" 33 U.S.C. Section 1311(h).

EPA regulations implementing Section 301(h) do not specify a minimum depth requirement. Rather, the regulations provide that an applicant's outfall and diffuser must be located and designed to provide:

"(1) . . . adequate initial dilution, dispersion and transport of wastewater to meet all applicable water quality standards at and beyond the boundary of the zone of initial dilution:

(i) During periods of maximum stratification and

(ii) During other periods when discharge characteristics, water quality, biological seasons, or

oceanographic conditions indicate more critical situations may exist.

(2) Following initial dilution, the partially diluted wastewater and particulates must be transported and dispersed so as not to affect water use areas adversely (including recreational and fishing areas) and areas of biological sensitivity." 40 C.F.R. Section 125.61(a).

The EPA regulations consider depth to be "one factor in the environmental calculus set up in section [301(h)]". Natural Resources Defense Council v. United States Environmental Protection Agency, 656 F.2d 768 (D.C.Cir. 1981). This interpretation has been upheld by the courts. See *id.*

Therefore, the issue raised by petitioners is whether the dilution, dispersion and transport of wastewater discharged from the Watsonville outfall are adequate. Tetra Tech calculated the initial dilution of the Watsonville discharge to range from 82 to 160. See TRR, Pages 150-155, Table 29. The resulting minimum initial dilution was 82. Tetra Tech calculated a minimum initial dilution of 81, if no ambient current were assumed.

In order for the minimum initial dilution of the discharge to be considered adequate, the toxic material objectives in Table B of the Ocean Plan must be met at the edge of the zone of initial dilution. Ocean Plan, Chapter IV. In addition, in order to receive a 301(h) waiver, an applicant must demonstrate that its modified discharge will meet EPA water quality criteria after initial mixing in the waters surrounding or adjacent to the point at which such effluent is discharged. 33 U.S.C. Section 1311(h)(9).

In their review, Tetra Tech compared two sets of effluent data submitted by the City in their revised application with Ocean Plan Table B objectives and EPA water quality criteria for the protection of marine aquatic life. Tetra Tech calculated ambient water concentrations, using a minimum initial dilution of 81. Based upon these calculations, Tetra Tech concluded that all Ocean Plan objectives, except mercury, would be met, and for detected substances, all EPA criteria would be met except the chronic objective for mercury. The calculated concentration for mercury exceeded applicable criteria for only one set of data. Without additional data, it is impossible to determine whether the one data set represents a rare or frequent occurrence.

Since the data indicate that all standards except for the mercury standard will be met at the edge of the zone of initial dilution, it is reasonable to conclude that the initial dilution is adequate. With respect to the mercury objective, a full characterization of effluent quality would be appropriate. If compliance with the objective becomes a problem, Watsonville should consider modifying its pretreatment program, additional source control measures, or treatment alternatives.

Factors affecting dispersion and transport include currents and the likelihood of the effluent plume reaching the surface. The Tetra Tech report indicated that the net current near the existing and extended Watsonville outfall is predominantly upcoast with a speed of approximately 10 centimeters per second. However, the generalized circulation

pattern varies seasonally and intermittent periods of downcoast drift were observed.

Tetra Tech calculated that the average depth at which the effluent plume from the Watsonville outfall would cease to rise was 12.2 meters. If the plume did surface, dispersion after initial dilution would be less than for a trapped plume, because the plume would float on the water surface; however, the initial dilution would be relatively great due to the increased height of the plume.

With regard to dispersion outside the zone of initial dilution, there is no evidence in the record to dispute the conclusion of the Regional Board and EPA that the depth of the discharge is adequate. One potential impact of a lack of sufficient dispersion would be accumulation of pollutants in localized areas. The bioaccumulation and bacterial monitoring required by Order No. 88-09 should provide improved data to evaluate this issue.

4. Contention: Petitioner, Friends of the Sea Otter, contends that the Regional Board erred in determining that the Watsonville discharge would comply with the federal antidegradation policy.

Finding: In order to obtain a 301(h) waiver, an applicant must submit a determination by the State that the modified discharge will comply with all applicable water quality standards. 40 C.F.R. Section 125.60(b)(2). One of the

applicable standards is the federal antidegradation policy. See id. Section 131.6(b); State Board Order No. WQ 86-17.

The federal antidegradation policy requires that existing instream water uses be fully protected. 40 C.F.R. Section 131.12. Assuming that these uses are fully protected, the policy allows water quality to be lowered if the State finds that lowering water quality "is necessary to accommodate important economic or social development in the area in which the waters are located". Id.(a)(2). The policy further provides that "[w]here high quality waters constitute an outstanding National resource, . . . that water quality shall be maintained and protected". Id.(a)(3).

The Regional Board and EPA concluded that an antidegradation analysis was unnecessary because the Watsonville discharge would not lower water quality. Specifically, the Regional Board found that the Order No. 88-09 would not increase the mass emission of pollutants from the Watsonville plant over 1987 levels. Due to improvements in treatment at the plant, the annual average mass emissions of BOD would be reduced by 42 percent while SS would increase by only two percent over existing discharge levels. This increase was considered insignificant. In addition, the Regional Board found that the toxic materials effluent limitations in Order No. 88-09 were generally more restrictive than the effluent limitations in the prior waste discharge requirements for the Watsonville discharge, Order No. 84-47. The effluent limitations in Order No. 88-09 .

were based upon Table B of the 1988 Ocean Plan, which contains more stringent limitations for most constituents than Table B of the 1983 Ocean Plan. Finally, the Regional Board noted that the new outfall configuration would improve water quality by providing for a greatly improved disposal configuration, allowing for better mixing and dilution of the effluent with the receiving waters.

The Regional Board's conclusion appears to be reasonable. A comparison of the proposed discharge authorized by Order No. 88-09 with the existing discharge indicates that there should be no lowering of water quality. Therefore, the Regional Board fulfilled the requirements of the federal antidegradation policy.

5. Contention: Petitioners contend that a 301(h) waiver was inappropriate in this case because recent legislation directs that Monterey Bay be designated as a National Marine Sanctuary.

Finding: On November 7, 1988, the reauthorization of Title III of the Marine Protection, Research, and Sanctuary Act of 1972 (the Act) was signed into law. Public Law 100-627, 16 U.S.C. Section 1431 et seq. Section 205 of the Act directs the Secretary of Commerce to issue a notice designating Monterey Bay as a National Marine Sanctuary no later than December 31, 1989.

On January 6, 1989, the Department of Commerce published a notice in the Federal Register that, as required by Congress, the National Oceanic and Atmospheric Administration (NOAA) of the

Department of Commerce had named Monterey Bay as an Active Candidate for designation as a National Marine Sanctuary. 54 Federal Register 448-452. The next steps in the evaluation process include preparation of an environmental impact statement (EIS) and a management plan. See 16 U.S.C. Section 1434. The management plan will specify the goals and objectives of sanctuary designation and describe programs for resource protection, research and interpretation. The various administrative and regulatory alternatives to sanctuary management will be analyzed in the EIS.

To date, however, NOAA has not published notice of the availability of a draft EIS and management plan for Monterey Bay. Therefore, the impact, if any, of Watsonville's 301(h) waiver on sanctuary designation cannot be determined at the present time.

The Regional Board points out that one of the purposes of the Act is "to support, promote, and coordinate scientific research on, and monitoring of, the resources of these marine areas. Id. Sec. 1421(b)(3). The monitoring data supplied by Watsonville under Order No. 88-09 during its five-year term may assist in meeting the purposes of the Act. In any event, we cannot conclude, at the present time, that designation of Monterey Bay as a National Marine Sanctuary is inconsistent with Watsonville's 301(h) waiver.

III. CONCLUSIONS

1. Order No. 88-09 adequately protects the water quality of Monterey Bay for the beneficial uses of sea otter habitat and shellfish harvesting.

2. The sea otter monitoring program in Monitoring and Reporting Program No. 88-09 is adequate.

3. Section VI.B. of Monitoring and Reporting Program No. 88-09 should be amended to require that the caged bivalves be analyzed for total and fecal coliform and enterococcus.

4. The depth of the Watsonville discharge is adequate.

5. The Regional Board complied with the federal antidegradation policy.

6. The adoption of Order No. 88-09 is not in conflict, at the present time, with designation of Monterey Bay as a National Marine Sanctuary.

IV. ORDER

IT IS HEREBY ORDERED that Section VI.B. of Monitoring and Reporting Program No. 88-09 is amended as provided in this Order.

IT IS FURTHER ORDERED that the petitions of Friends of the Sea Otter and the Department of Fish and Game are otherwise denied.

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on January 18, 1990.

AYE: W. Don Maughan
 Darlene E. Ruiz
 Eliseo M. Samaniego
 Danny Walsh

NO: None

ABSENT: Edwin H. Finster

ABSTAIN: None



Maureen Marché
Administrative Assistant to the Board